

excavating a pilot shaft; and

excavating a collar around said pilot shaft, said collar excavating step comprising:

inserting a piloted drill barrel partially into said pilot shaft, said piloted drill barrel having (a) a barrel portion comprising a hammer drill extending distally therefrom near said barrel portion's periphery, and (b) a pilot portion formed integrally and in substantial axial alignment with said barrel portion and having a diameter suitable for piloting said barrel portion during excavation;

supplying pressurized air to said hammer drill, thereby to activate said hammer drill; and

rotating said piloted drill barrel with a drive mechanism.

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### Argument

In the Office Action mailed October 3, 2000, the examiner rejected claims 1 and 23 under 35 USC § 102(b) as being anticipated by Kelly, Jr. This rejection is respectfully traversed. Kelly, Jr. merely discloses a conventional "gang drill" or "cluster drill" in which several downhole hammers all drill the face of the shaft simultaneously. Central downhole hammer 50 cuts the center of the shaft at the same time that the peripheral hammers 52 drill the periphery of the shaft. In contrast, Applicant's invention has a true pilot 6 (FIG. 1) which is inserted into a pre-drilled shaft that is smaller than the foundation shaft to be drilled by the core barrel. The pilot portion on Applicant's invention may pick cuttings from the bottom of the pre-drilled pilot shaft, but it does not cut the face of the pilot shaft. "Pilot portion" in claim 1 must be interpreted consistently with the specification that describes this feature of Applicant's invention; it is clearly not a centrally disposed hammer drill like the one shown in the gang drill of Kelly, Jr.

The rejection of claim 23 based on Kelly, Jr. also cannot be sustained. Claim 23 recites a barrel portion which is “substantially hollow and substantially open at its proximal end.” This allows cuttings to be brought up into the interior of the barrel via the augur flight and the pilot portion, and also to allow cuttings to fall into the barrel if they are blown up around the side of the core barrel. The barrel thereby acts as a receptacle for cuttings, and can be brought to the surface and emptied, thereby greatly facilitating the removal of cuttings. Kelly, Jr. discloses nothing more than a collection of hammer drills. He does not even disclose a barrel at all, much less a barrel which is substantially hollow and substantially open to receive a volume of cuttings to facilitate their removal from the shaft.

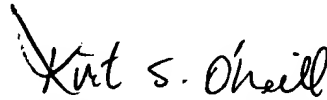
Claims 1, 2, 23, 26 and 27 were rejected under 35 USC § 102(b) as being anticipated by SU590445. However, the drilling apparatus of this reference is very different from Applicant’s invention. The pilot or “guide stem” in SU590445 is driven as a piston, moving longitudinally with respect to the hammer drills. The piston action “forces the drillings down the helix [augur flight] into the pilot hole.” In other words, this apparatus is designed to force all the cuttings down into the pilot shaft. In contrast, Applicant’s invention has a pilot portion which is formed integrally with the barrel portion so that the cuttings may be removed from the pilot shaft. This cutting removal capability would be substantially impaired or completely absent with a piston-like arrangement as shown in SU590445. Claims 1 and 26 have been amended to provide that the pilot portion is “formed integrally” with the barrel portion; support for this limitation is found in the specification at page 12, lines 3 – 13 in FIGS. 1, 2 and 17.

Claim 23 is also clearly novel over SU590445. The drill barrel of claim 23 is concerned with collecting cuttings for removal from the shaft, quite unlike SU590445, which forces the drillings down into the pilot hole. Claim 23 recites that the barrel portion is “substantially

hollow and substantially open at its proximal end” for the collection of cuttings. SU590445 says nothing about the barrel being adapted to receive or discharge cuttings at the proximal end; in fact, the top end of the core barrel is not shown or discussed at all. In any event, SU590445 is concerned with pushing the cuttings down into the shaft, which would make it wholly unnecessary to have a barrel portion that receives and collects the cuttings. Therefore, claim 23 is believed to be patentable over SU590445 as written.

In view of the foregoing, all of the claims are believed to be allowable over the prior art of record. An early allowance is respectfully requested.

Respectfully submitted,



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Date: 7-26-01

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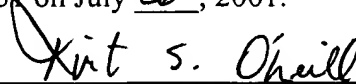
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**OFFICE OF PETITIONS**

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Marked-Up Copy of Claims

1. (Amended) A piloted drill barrel for excavating a shaft in hard rock or other relatively hard earthen material, comprising:

a barrel portion comprising a downhole hammer drill disposed substantially within said barrel portion near the barrel portion's periphery for excavating a collar around a pilot shaft; and

a pilot portion formed integrally and axially aligned with said barrel portion and extending distally therefrom to pilot said barrel portion along said pilot shaft during excavation of a larger diameter shaft.

26. (Amended) A method of excavating a relatively large diameter shaft in hard rock or other relatively hard earthen material, comprising the steps of:

excavating a pilot shaft; and

excavating a collar around said pilot shaft, said collar excavating step comprising:

inserting a piloted drill barrel partially into said pilot shaft, said piloted drill barrel having (a) a barrel portion comprising a hammer drill extending distally therefrom near said barrel portion's periphery, and (b) a pilot portion formed integrally and in substantial axial alignment with said barrel portion and having a diameter suitable for piloting said barrel portion during excavation;

supplying pressurized air to said hammer drill, thereby to activate said hammer drill; and

rotating said piloted drill barrel with a drive mechanism.